QUALITY CONTROL REPORTS FOR

SEMI DENSE BITUMINOUS CONCRETE

CIVIL-TECH CONSULTANTS AND ENGINEERS

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Job No.: CTCE/BBMP/W.No07/RSCN/SDBC(QB)/2014-15

18.06.2014

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	:	**Mr. Ramsingh Chandra Naik,** Contractor, Bangalore.
NAME OF THE WORK	:	Improvements to Roads, Drains and Asphalting to roads in Vinayaka Layout 1st Cross & 2nd Cross , 2nd Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
REFERENCE	:	EE/BTP/BBMP-E-PMT/157/2013-14 Dated: 09.10.2013
SOURCE OF LOCATION	:	Hot mix Plant, Bangalore
DATE OF TESTING	:	18.06.2014

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	84	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	44	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	300	Min. 220

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Job No.: CTCE/BBMP/W.No07/RSCN/SDBC/AIV/2014-15

18.06.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ramsingh Chandra Naik,** Contractor, Bangalore.
Name of the Work	Improvements to Roads, Drains and Asphalting to roads in Vinayaka Layout 1st Cross & 2nd Cross , 2nd Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP-E-PMT/157/2013-14 Dated: 09.10.2013
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	18.06.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	384	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	304	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	20.83	21.41	**21.12**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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18.06.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ramsingh Chandra Naik,** Contractor, Bangalore.
Name of the Work	Improvements to Roads, Drains and Asphalting to roads in Vinayaka Layout 1st Cross & 2nd Cross , 2nd Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP-E-PMT/157/2013-14 Dated: 09.10.2013
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	18.06.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	387	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	84	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	303	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.71	22.02	21.86

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No07/RSCN/SDBC/Shape_T/2014-15 : 18.06.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Mr. Ramsingh Chandra Naik,** Contractor, Bangalore.
Name of Work	: Improvements to Roads, Drains and Asphalting to roads in Vinayaka Layout 1st Cross & 2nd Cross , 2nd Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	: EE/BTP/BBMP-E-PMT/157/2013-14 Dated: 09.10.2013
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 18.06.2014

Result : Flakiness Index = **11.52%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **24.77%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No07/RSCN/SDBC/Shape_T/2014-15 : 18.06.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Mr. Ramsingh Chandra Naik,** Contractor, Bangalore.
Name of Work	: Improvements to Roads, Drains and Asphalting to roads in Vinayaka Layout 1st Cross & 2nd Cross , 2nd Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	: EE/BTP/BBMP-E-PMT/157/2013-14 Dated: 09.10.2013
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 18.06.2014

Result : Flakiness Index = **12.58%**

Elongation Index = **13.05%**

Result : Combined Flakiness & Elongation index **25.63%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No07/RSCN/SDBC/Stripping/2014-15 19.06.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ramsingh Chandra Naik,** Contractor, Bangalore.
Name of the work	Improvements to Roads, Drains and Asphalting to roads in Vinayaka Layout 1st Cross & 2nd Cross , 2nd Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP-E-PMT/157/2013-14 Dated: 09.10.2013
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	19.06.2014

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.30	96.70
2	3.3		
3	3.4		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No07/RSCN/SDBC/Sp_Wa/2014-15 19.06.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ramsingh Chandra Naik,** Contractor, Bangalore.
Name of the Work	Improvements to Roads, Drains and Asphalting to roads in Vinayaka Layout 1st Cross & 2nd Cross , 2nd Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP-E-PMT/157/2013-14 Dated: 09.10.2013
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	19.06.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2025	2023	2022	
2	Weight of basket suspended in water	W_2 g	755	2020	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1270	1268	1267	
4	Weight of saturated surface dry aggregate in air	W_3 g	2018	2019	2020	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	748	751	753	
6	Weight of oven dried aggregate	W_4 g	2000	2006	2010	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.674	2.671	2.669	2.671
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.740	2.718	2.705	2.721
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.90%	0.65%	0.50%	0.68%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No07/RSCN/SDBC/Bit/2014-15 19.06.2014

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX AS per IRC:SP:-1984

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr. Ramsingh Chandra Naik,** Contractor, Bangalore.
NAME OF THE WORK	Improvements to Roads, Drains and Asphalting to roads in Vinayaka Layout 1st Cross & 2nd Cross , 2nd Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP-E-PMT/157/2013-14 Dated: 09.10.2013
SAMPLE I/D	Roads in 2nd Stage, Vinayaka Layout in Ward No.07.
DATE OF TESTING	19.06.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474.5	474.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25.5	25.50
7. Bitumen content in %	5.10	5.10
8. Average	**5.10**	

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Job No.: CTCE/BBMP/W.No07/RSCN/SDBC/Bit/2014-15 19.06.2014

BITUMEN CONTENT GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr. Ramsingh Chandra Naik,** Contractor, Bangalore.
NAME OF THE WORK	Improvements to Roads, Drains and Asphalting to roads in Vinayaka Layout 1st Cross & 2nd Cross , 2nd Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP-E-PMT/157/2013-14 Dated: 09.10.2013
SAMPLE I/D	Roads in 2nd Stage, Vinayaka Layout in Ward No.07.
DATE OF TESTING	19.06.2014

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GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	25.32	5.34	5.34	94.66	90-100
4.75	256.3	54.01	59.35	40.65	35-51
2.36	55.32	11.66	71.01	28.99	24-39
1.18	40.22	8.48	79.49	20.51	15-30
0.3	32.65	6.88	86.37	13.63	9-19
0.075	33.25	7.01	93.37	6.63	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	31.22	6.58	6.58	93.42	90-100
4.75	262.5	55.32	61.90	38.10	35-51
2.36	61.22	12.90	74.80	25.20	24-39
1.18	33.36	7.03	81.83	18.17	15-30
0.3	32.29	6.81	88.64	11.36	9-19
0.075	25.12	5.29	93.93	6.07	3-8

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Job No.: CTCE/BBMP/W.No07/RSCN/SDBC/AGG/2014-15 19.06.2014

Aggregate Gradation Test

IS : 2386 Part I

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ramsingh Chandra Naik,** Contractor, Bangalore.
Name of the Work	Improvements to Roads, Drains and Asphalting to roads in Vinayaka Layout 1st Cross & 2nd Cross , 2nd Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP-E-PMT/157/2013-14 Dated: 09.10.2013
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	19.06.2014

Total Weight of Sample: **5100** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	380	7.5	7.45	92.55	90-100	
4.75	2715	53.2	60.69	39.31	35-51	
2.36	625	12.3	72.94	27.06	24-39	
1.18	485	9.5	82.45	17.55	15-30	
0.3	350	6.9	89.31	10.69	9-19	
0.075	320	6.3	95.59	4.41	3-8	

Total Weight of Sample: **5150** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	360	7.0	6.99	93.01	90-100	
4.75	2595	50.4	57.38	42.62	35-51	
2.36	855	16.6	73.98	26.02	24-39	
1.18	435	8.4	82.43	17.57	15-30	
0.3	350	6.8	89.22	10.78	9-19	
0.075	300	5.8	95.05	4.95	3-8	

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